



SEQUENCE LISTING

<110> Bogan, Jonathan S.
Lodish, Harvey F.

<120> Expression Cloning Method

<130> 0399.2025-002

<140> US 10/058,820

<141> 2002-01-28

<150> US 60/325,651

<151> 2001-09-28

<150> US 60/298,963

<151> 2001-06-18

<150> US 60/264,816

<151> 2001-01-26

<160> 24

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 550

<212> PRT

<213> Mus musculus

<400> 1

Met	Ala	Ala	Pro	Ala	Gly	Gly	Gly	Gly	Ser	Ala	Val	Ser	Val	Leu	Ala
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Pro	Asn	Gly	Arg	Arg	His	Thr	Val	Lys	Val	Thr	Pro	Ser	Thr	Val	Leu
			20					25					30		
Leu	Gln	Val	Leu	Glu	Asp	Thr	Cys	Arg	Arg	Gln	Asp	Phe	Asn	Pro	Ser
		35					40					45			
Glu	Tyr	Asp	Leu	Lys	Phe	Gln	Arg	Thr	Val	Leu	Asp	Leu	Ser	Leu	Gln
	50					55					60				
Trp	Arg	Phe	Ala	Asn	Leu	Pro	Asn	Asn	Ala	Lys	Leu	Glu	Met	Val	Pro
65				70						75				80	
Val	Ser	Arg	Ser	Arg	Glu	Gly	Pro	Glu	Asn	Ile	Val	Arg	Ile	Ala	Phe
			85						90					95	
Gln	Leu	Asp	Asp	Gly	Ser	Arg	Leu	Gln	Asp	Ala	Phe	Cys	Ser	Arg	Gln
		100						105					110		
Thr	Leu	Trp	Glu	Leu	Leu	Ser	His	Phe	Ala	Gln	Thr	Arg	Glu	Arg	Leu
		115					120					125			
Gln	Gln	Leu	Gly	Glu	Lys	Thr	Pro	Val	Cys	Val	Tyr	Met	Arg	Asn	Glu
	130					135					140				
Val	Thr	Gly	Arg	Ala	Ala	Leu	Gln	Asn	Thr	Thr	Leu	Gln	Ser	Leu	Gly
145				150						155				160	
Leu	Thr	Gly	Gly	Ser	Ala	Thr	Ile	Arg	Phe	Val	Ile	Lys	Gln	Cys	Asp
			165						170				175		
Thr	Ala	Gly	Lys	Gln	Glu	Ser	Ile	Ala	Val	Arg	Ser	Lys	Ala	Pro	Gly
			180					185					190		

Ser Pro Val Ser Ser Leu Ser Ala Asp Gln Ala Ser Ser Ser Thr Leu
 195 200 205
 Leu Pro Leu Asn Ser Gly Glu Phe Ser Arg Gly Asp Leu Asn His Glu
 210 215 220
 Gly Asp Ala Asn Thr Ser Gly Thr Gly Leu Glu Gly Gly Pro Lys Pro
 225 230 235 240
 Thr Asp Ala Gln Thr Lys Gln Ser Thr Ser Glu Pro Ala Ser Ala Pro
 245 250 255
 Phe Val Pro Phe Ser Gly Gly Gly Gln Arg Leu Gly Gly Pro Ser Ala
 260 265 270
 Ser Leu Arg Pro Leu Thr Ser Pro Ser Ala Asn Ser Ser Lys Ser Phe
 275 280 285
 Ser Gly Pro Gly Gly Pro Ser Lys Pro Lys Lys Pro Lys Pro Gly Glu
 290 295 300
 Glu Pro Gln Gln Glu Pro Glu Pro Pro Val Asp Arg Asp Pro Val Val
 305 310 315 320
 Tyr His Pro Asp Leu Glu Asp Leu Leu Gln Pro Trp Pro Ala Glu Val
 325 330 335
 Pro Asp Glu Phe Glu Val Thr Val Asp Asp Val Arg Arg Arg Leu
 340 345 350
 Ala Gln Leu Lys Ser Glu Arg Lys Arg Leu Glu Glu Ala Pro Leu Val
 355 360 365
 Thr Lys Ala Phe Arg Glu Ala Gln Met Lys Glu Lys Leu Glu Arg Tyr
 370 375 380
 Pro Lys Val Ala Leu Arg Val Leu Phe Pro Asp Arg Tyr Ile Leu Gln
 385 390 395 400
 Gly Phe Phe Arg Pro Ser Glu Thr Val Gly Asp Leu Arg Asp Phe Val
 405 410 415
 Arg Ser His Leu Gly Asn Pro Glu Leu Ser Phe Tyr Leu Phe Ile Ala
 420 425 430
 Pro Pro Lys Met Val Leu Asp Asp His Thr Leu Thr Leu Phe Gln Ala
 435 440 445
 Asn Leu Phe Pro Ala Ala Leu Val His Phe Gly Ala Glu Glu Pro Thr
 450 455 460
 Gly Leu Tyr Leu Glu Pro Gly Leu Leu Glu His Thr Val Ser Pro Ser
 465 470 475 480
 Thr Ala Asp Val Leu Val Ala Arg Cys Met Ser Arg Ala Ser Gly Ser
 485 490 495
 Pro Pro Leu Leu Pro Ala Pro Asp Pro Val Ser Leu Glu Ser Glu Pro
 500 505 510
 Ile Ala Glu Asp Gly Ala Leu Gly Pro Pro Glu Pro Ile Gln Gly Thr
 515 520 525
 Ala Gln Pro Val Lys Arg Ser Leu Gly Lys Val Pro Lys Trp Leu Lys
 530 535 540
 Leu Pro Ala Ser Lys Arg
 545 550

<210> 2
 <211> 473
 <212> PRT
 <213> Mus musculus

<400> 2
 Met Val Pro Val Ser Arg Ser Arg Glu Gly Pro Glu Asn Ile Val Arg
 1 5 10 15

Ile	Ala	Phe	Gln	Leu	Asp	Asp	Gly	Ser	Arg	Leu	Gln	Asp	Ala	Phe	Cys	20	25	30
Ser	Arg	Gln	Thr	Leu	Trp	Glu	Leu	Leu	Ser	His	Phe	Ala	Gln	Thr	Arg	35	40	45
Glu	Arg	Leu	Gln	Gln	Leu	Gly	Glu	Lys	Thr	Pro	Val	Cys	Val	Tyr	Met	50	55	60
Arg	Asn	Glu	Val	Thr	Gly	Arg	Ala	Ala	Leu	Gln	Asn	Thr	Thr	Leu	Gln	65	70	75
Ser	Leu	Gly	Leu	Thr	Gly	Gly	Ser	Ala	Thr	Ile	Arg	Phe	Val	Ile	Lys	85	90	95
Gln	Cys	Asp	Thr	Ala	Gly	Lys	Gln	Glu	Ser	Ile	Ala	Val	Arg	Ser	Lys	100	105	110
Ala	Pro	Gly	Ser	Pro	Val	Ser	Ser	Leu	Ser	Ala	Asp	Gln	Ala	Ser	Ser	115	120	125
Ser	Thr	Leu	Leu	Pro	Leu	Asn	Ser	Gly	Glu	Phe	Ser	Arg	Gly	Asp	Leu	130	135	140
Asn	His	Glu	Gly	Asp	Ala	Asn	Thr	Ser	Gly	Thr	Gly	Leu	Glu	Gly	Gly	145	150	155
Pro	Lys	Pro	Thr	Asp	Ala	Gln	Thr	Lys	Gln	Ser	Thr	Ser	Glu	Pro	Ala	165	170	175
Ser	Ala	Pro	Phe	Val	Pro	Phe	Ser	Gly	Gly	Gly	Gln	Arg	Leu	Gly	Gly	180	185	190
Pro	Ser	Ala	Ser	Leu	Arg	Pro	Leu	Thr	Ser	Pro	Ser	Ala	Asn	Ser	Ser	195	200	205
Lys	Ser	Phe	Ser	Gly	Pro	Gly	Gly	Pro	Ser	Lys	Pro	Lys	Lys	Pro	Lys	210	215	220
Pro	Gly	Glu	Glu	Pro	Gln	Glu	Pro	Glu	Pro	Pro	Val	Asp	Arg	Asp		225	230	235
Pro	Val	Val	Tyr	His	Pro	Asp	Leu	Glu	Asp	Leu	Leu	Gln	Pro	Trp	Pro	245	250	255
Ala	Glu	Val	Pro	Asp	Glu	Phe	Phe	Glu	Val	Thr	Val	Asp	Asp	Val	Arg	260	265	270
Arg	Arg	Leu	Ala	Gln	Leu	Lys	Ser	Glu	Arg	Lys	Arg	Leu	Glu	Glu	Ala	275	280	285
Pro	Leu	Val	Thr	Lys	Ala	Phe	Arg	Glu	Ala	Gln	Met	Lys	Glu	Lys	Leu	290	295	300
Glu	Arg	Tyr	Pro	Lys	Val	Ala	Leu	Arg	Val	Leu	Phe	Pro	Asp	Arg	Tyr	305	310	315
Ile	Leu	Gln	Gly	Phe	Phe	Arg	Pro	Ser	Glu	Thr	Val	Gly	Asp	Leu	Arg	325	330	335
Asp	Phe	Val	Arg	Ser	His	Leu	Gly	Asn	Pro	Glu	Leu	Ser	Phe	Tyr	Leu	340	345	350
Phe	Ile	Ala	Pro	Pro	Lys	Met	Val	Leu	Asp	Asp	His	Thr	Leu	Thr	Leu	355	360	365
Phe	Gln	Ala	Asn	Leu	Phe	Pro	Ala	Ala	Leu	Val	His	Phe	Gly	Ala	Glu	370	375	380
Glu	Pro	Thr	Gly	Leu	Tyr	Leu	Glu	Pro	Gly	Leu	Leu	Glu	His	Thr	Val	385	390	395
Ser	Pro	Ser	Thr	Ala	Asp	Val	Leu	Val	Ala	Arg	Cys	Met	Ser	Arg	Ala	405	410	415
Ser	Gly	Ser	Pro	Pro	Leu	Leu	Pro	Ala	Pro	Asp	Pro	Val	Ser	Leu	Glu	420	425	430
Ser	Glu	Pro	Ile	Ala	Glu	Asp	Gly	Ala	Leu	Gly	Pro	Pro	Glu	Pro	Ile	435	440	445
Gln	Gly	Thr	Ala	Gln	Pro	Val	Lys	Arg	Ser	Leu	Gly	Lys	Val	Pro	Lys	450	455	460

Trp Leu Lys Leu Pro Ala Ser Lys Arg
465 470

<210> 3
<211> 553
<212> PRT
<213> Homo sapiens

<400> 3
Met Ala Ala Pro Ala Gly Gly Gly Gly Ser Ala Val Ser Val Leu Ala
1 5 10 15
Pro Asn Gly Arg Arg His Thr Val Lys Val Thr Pro Ser Thr Val Leu
20 25 30
Leu Gln Val Leu Glu Asp Thr Cys Arg Arg Gln Asp Phe Asn Pro Cys
35 40 45
Glu Tyr Asp Leu Lys Phe Gln Arg Ser Val Leu Asp Leu Ser Leu Gln
50 55 60
Trp Arg Phe Ala Asn Leu Pro Asn Asn Ala Lys Leu Glu Met Val Pro
65 70 75 80
Ala Ser Arg Ser Arg Glu Gly Pro Glu Asn Met Val Arg Ile Ala Leu
85 90 95
Gln Leu Asp Asp Gly Ser Arg Leu Gln Asp Ser Phe Cys Ser Gly Gln
100 105 110
Thr Leu Trp Glu Leu Leu Ser His Phe Pro Gln Ile Arg Glu Cys Leu
115 120 125
Gln His Pro Gly Gly Ala Thr Pro Val Cys Val Tyr Thr Arg Asp Glu
130 135 140
Val Thr Gly Glu Ala Ala Leu Arg Gly Thr Thr Leu Gln Ser Leu Gly
145 150 155 160
Leu Thr Gly Gly Ser Ala Thr Ile Arg Phe Val Met Lys Cys Tyr Asp
165 170 175
Pro Val Gly Lys Thr Pro Gly Ser Leu Gly Ser Ser Ala Ser Ala Gly
180 185 190
Gln Ala Ala Ser Ala Pro Leu Pro Leu Glu Ser Gly Glu Leu Ser
195 200 205
Arg Gly Asp Leu Ser Arg Pro Glu Asp Ala Asp Thr Ser Gly Pro Cys
210 215 220
Cys Glu His Thr Gln Glu Lys Gln Ser Thr Arg Ala Pro Ala Ala Ala
225 230 235 240
Pro Phe Val Pro Phe Ser Gly Gly Gly Gln Arg Leu Gly Gly Pro Pro
245 250 255
Gly Pro Thr Arg Pro Leu Thr Ser Ser Ser Ala Lys Leu Pro Lys Ser
260 265 270
Leu Ser Ser Pro Gly Gly Pro Ser Lys Pro Lys Lys Ser Lys Ser Gly
275 280 285
Gln Asp Pro Gln Gln Glu Gln Glu Gln Glu Arg Glu Arg Asp Pro Gln
290 295 300
Gln Glu Gln Glu Arg Glu Arg Pro Val Asp Arg Glu Pro Val Asp Arg
305 310 315 320
Glu Pro Val Val Cys His Pro Asp Leu Glu Glu Arg Leu Gln Ala Trp
325 330 335
Pro Ala Glu Leu Pro Asp Glu Phe Phe Glu Leu Thr Val Asp Asp Val
340 345 350
Arg Arg Arg Leu Ala Gln Leu Lys Ser Glu Arg Lys Arg Leu Glu Glu
355 360 365

Ala Pro Leu Val Thr Lys Ala Phe Arg Glu Ala Gln Ile Lys Glu Lys
 370 375 380
 Leu Glu Arg Tyr Pro Lys Val Ala Leu Arg Val Leu Phe Pro Asp Arg
 385 390 395 400
 Tyr Val Leu Gln Gly Phe Phe Arg Pro Ser Glu Thr Val Gly Asp Leu
 405 410 415
 Arg Asp Phe Val Arg Ser His Leu Gly Asn Pro Glu Leu Ser Phe Tyr
 420 425 430
 Leu Phe Ile Thr Pro Pro Lys Thr Val Leu Asp Asp His Thr Gln Thr
 435 440 445
 Leu Phe Gln Ala Asn Leu Phe Pro Ala Ala Leu Val His Leu Gly Ala
 450 455 460
 Glu Glu Pro Ala Gly Val Tyr Leu Glu Pro Gly Leu Leu Glu His Ala
 465 470 475 480
 Ile Ser Pro Ser Ala Ala Asp Val Leu Val Ala Arg Tyr Met Ser Arg
 485 490 495
 Ala Ala Gly Ser Pro Ser Pro Leu Pro Ala Pro Asp Pro Ala Pro Lys
 500 505 510
 Ser Glu Pro Ala Ala Glu Glu Gly Ala Leu Val Pro Pro Glu Pro Ile
 515 520 525
 Pro Gly Thr Ala Gln Pro Val Lys Arg Ser Leu Gly Lys Val Pro Lys
 530 535 540
 Trp Leu Lys Leu Pro Ala Ser Lys Arg
 545 550

<210> 4

<211> 476

<212> PRT

<213> Homo sapiens

<400> 4

Met Val Pro Ala Ser Arg Ser Arg Glu Gly Pro Glu Asn Met Val Arg
 1 5 10 15
 Ile Ala Leu Gln Leu Asp Asp Gly Ser Arg Leu Gln Asp Ser Phe Cys
 20 25 30
 Ser Gly Gln Thr Leu Trp Glu Leu Leu Ser His Phe Pro Gln Ile Arg
 35 40 45
 Glu Cys Leu Gln His Pro Gly Gly Ala Thr Pro Val Cys Val Tyr Thr
 50 55 60
 Arg Asp Glu Val Thr Gly Glu Ala Ala Leu Arg Gly Thr Thr Leu Gln
 65 70 75 80
 Ser Leu Gly Leu Thr Gly Gly Ser Ala Thr Ile Arg Phe Val Met Lys
 85 90 95
 Cys Tyr Asp Pro Val Gly Lys Thr Pro Gly Ser Leu Gly Ser Ser Ala
 100 105 110
 Ser Ala Gly Gln Ala Ala Ala Ser Ala Pro Leu Pro Leu Glu Ser Gly
 115 120 125
 Glu Leu Ser Arg Gly Asp Leu Ser Arg Pro Glu Asp Ala Asp Thr Ser
 130 135 140
 Gly Pro Cys Cys Glu His Thr Gln Glu Lys Gln Ser Thr Arg Ala Pro
 145 150 155 160
 Ala Ala Ala Pro Phe Val Pro Phe Ser Gly Gly Gly Gln Arg Leu Gly
 165 170 175
 Gly Pro Pro Gly Pro Thr Arg Pro Leu Thr Ser Ser Ser Ala Lys Leu
 180 185 190

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Pro Lys Ser Leu Ser Ser Pro Gly Gly Pro Ser Lys Pro Lys Lys Ser
 195 200 205
 Lys Ser Gly Gln Asp Pro Gln Gln Glu Gln Glu Gln Glu Arg Glu Arg
 210 215 220
 Asp Pro Gln Gln Glu Gln Glu Arg Glu Arg Pro Val Asp Arg Glu Pro
 225 230 235 240
 Val Asp Arg Glu Pro Val Val Cys His Pro Asp Leu Glu Glu Arg Leu
 245 250 255
 Gln Ala Trp Pro Ala Glu Leu Pro Asp Glu Phe Phe Glu Leu Thr Val
 260 265 270
 Asp Asp Val Arg Arg Arg Leu Ala Gln Leu Lys Ser Glu Arg Lys Arg
 275 280 285
 Leu Glu Glu Ala Pro Leu Val Thr Lys Ala Phe Arg Glu Ala Gln Ile
 290 295 300
 Lys Glu Lys Leu Glu Arg Tyr Pro Lys Val Ala Leu Arg Val Leu Phe
 305 310 315 320
 Pro Asp Arg Tyr Val Leu Gln Gly Phe Phe Arg Pro Ser Glu Thr Val
 325 330 335
 Gly Asp Leu Arg Asp Phe Val Arg Ser His Leu Gly Asn Pro Glu Leu
 340 345 350
 Ser Phe Tyr Leu Phe Ile Thr Pro Pro Lys Thr Val Leu Asp Asp His
 355 360 365
 Thr Gln Thr Leu Phe Gln Ala Asn Leu Phe Pro Ala Ala Leu Val His
 370 375 380
 Leu Gly Ala Glu Glu Pro Ala Gly Val Tyr Leu Glu Pro Gly Leu Leu
 385 390 395 400
 Glu His Ala Ile Ser Pro Ser Ala Ala Asp Val Leu Val Ala Arg Tyr
 405 410 415
 Met Ser Arg Ala Ala Gly Ser Pro Ser Pro Leu Pro Ala Pro Asp Pro
 420 425 430
 Ala Pro Lys Ser Glu Pro Ala Ala Glu Glu Gly Ala Leu Val Pro Pro
 435 440 445
 Glu Pro Ile Pro Gly Thr Ala Gln Pro Val Lys Arg Ser Leu Gly Lys
 450 455 460
 Val Pro Lys Trp Leu Lys Leu Pro Ala Ser Lys Arg
 465 470 475

<210> 5

<211> 441

<212> PRT

<213> Mus musculus

<400> 5

Met Lys Lys Phe Phe Gln Glu Ile Lys Ala Asp Ile Lys Phe Lys Ser
 1 5 10 15
 Ala Gly Pro Gly Gln Lys Leu Thr Asp Ser Ala Gly Glu Lys Thr Thr
 20 25 30
 Lys Gly Lys Ser Pro Gln Leu Ala Leu Arg Gln Pro Arg Gln Gly Pro
 35 40 45
 Thr Asp Glu Ala Gln Met Ala Ala Ala Ala Leu Ala Arg Leu Glu
 50 55 60
 Gln Lys Gln Pro Arg Ala Arg Gly Pro Thr Ser Gln Asp Ser Ile Arg
 65 70 75 80
 Asn Gln Val Arg Lys Glu Leu Gln Ala Glu Ala Thr Ser Ser Asn Asn
 85 90 95

Pro Gly Ala Pro Gly Thr Asn Ser Val Pro Glu Pro Lys Glu Glu Ile
 100 105 110
 Ser Pro His Leu Ala Val Pro Gly Val Phe Phe Ile Cys Pro Leu Thr
 115 120 125
 Gly Val Thr Leu Arg Arg Asp Gln Arg Asp Ala His Ile Lys Gln Ala
 130 135 140
 Ile Leu Ser His Phe Ser Thr Asp Pro Val Ala Ala Ser Ile Met Lys
 145 150 155 160
 Ile His Thr Phe Asn Arg Asp Arg Asp Arg Val Lys Leu Gly Val Asp
 165 170 175
 Thr Ile Ala Lys Tyr Leu Asp Asn Ile His Leu His Pro Glu Glu Glu
 180 185 190
 Lys Tyr Gln Lys Ile Lys Leu Gln Asn Lys Val Phe Gln Glu Arg Ile
 195 200 205
 Asn Cys Leu Glu Gly Ser His Glu Phe Phe Glu Ala Ile Gly Phe Lys
 210 215 220
 Lys Val Thr Leu Pro Val Pro Asp Gln Glu Gly Gln Glu Glu Phe Tyr
 225 230 235 240
 Val Leu Gly Glu Asp Ala Arg Ala Pro Gln Asn Leu Ala Arg His Lys
 245 250 255
 Gln Gln Leu Leu Asp Ala Glu Pro Val Arg Ala Thr Leu Asp Arg Gln
 260 265 270
 Leu Arg Val Phe Arg Pro Ser Ala Leu Ala Ser His Phe Glu Leu Pro
 275 280 285
 Ser Asp Phe Phe Ser Leu Thr Ala Glu Glu Val Lys Arg Asp Glu Arg
 290 295 300
 Leu Arg Thr Glu Ala Val Glu Arg Leu Ser Ser Leu Arg Thr Lys Ala
 305 310 315 320
 Met Arg Glu Lys Glu Glu Gln Arg Asp Val Arg Lys Tyr Thr Tyr Ala
 325 330 335
 Leu Val Arg Val Arg Leu Pro Asp Gly Cys Leu Leu Gln Gly Thr Phe
 340 345 350
 Tyr Ala Arg Glu Lys Leu Ser Ala Leu Phe Arg Phe Val Arg Glu Ala
 355 360 365
 Leu Gln Asn Asp Trp Leu Pro Phe Glu Leu Arg Ala Ser Gly Gly Gln
 370 375 380
 Lys Leu Glu Glu Asn Glu Ala Leu Ala Leu Asn Glu Cys Gly Leu Val
 385 390 395 400
 Pro Ser Ala Leu Leu Thr Phe Ser Trp Asp Ala Ser Val Leu Glu Asp
 405 410 415
 Ile Arg Ala Ala Gly Ala Glu Pro Ala Lys Ser Val Leu Arg Pro Glu
 420 425 430
 Leu Leu Ala Ala Ile Glu Gln Leu Ser
 435 440

<210> 6
 <211> 441
 <212> PRT
 <213> Homo sapiens

<400> 6
 Met Lys Lys Phe Phe Gln Glu Phe Lys Ala Asp Ile Lys Phe Lys Ser
 1 5 10 15
 Ala Gly Pro Gly Gln Lys Leu Lys Glu Ser Val Gly Glu Lys Ala His
 20 25 30

Lys Glu Lys Pro Asn Gln Pro Ala Pro Arg Pro Pro Arg Gln Gly Pro
 35 40 45
 Thr Asn Glu Ala Gln Met Ala Ala Ala Ala Ala Leu Ala Arg Leu Glu
 50 55 60
 Gln Lys Gln Ser Arg Ala Trp Gly Pro Thr Ser Gln Asp Thr Ile Arg
 65 70 75 80
 Asn Gln Val Arg Lys Glu Leu Gln Ala Glu Ala Thr Val Ser Gly Ser
 85 90 95
 Pro Glu Ala Pro Gly Thr Asn Val Val Ser Glu Pro Arg Glu Glu Gly
 100 105 110
 Ser Ala His Leu Ala Val Pro Gly Val Tyr Phe Thr Cys Pro Leu Thr
 115 120 125
 Gly Ala Thr Leu Arg Lys Asp Gln Arg Asp Ala Cys Ile Lys Glu Ala
 130 135 140
 Ile Leu Leu His Phe Ser Thr Asp Pro Val Ala Ala Ser Ile Met Lys
 145 150 155 160
 Ile Tyr Thr Phe Asn Lys Asp Gln Asp Arg Val Lys Leu Gly Val Asp
 165 170 175
 Thr Ile Ala Lys Tyr Leu Asp Asn Ile His Leu His Pro Glu Glu Glu
 180 185 190
 Lys Tyr Arg Lys Ile Lys Leu Gln Asn Lys Val Phe Gln Glu Arg Ile
 195 200 205
 Asn Cys Leu Glu Gly Thr His Glu Phe Phe Glu Ala Ile Gly Phe Gln
 210 215 220
 Lys Val Leu Leu Pro Ala Gln Asp Gln Glu Asp Pro Glu Glu Phe Tyr
 225 230 235 240
 Val Leu Ser Glu Thr Thr Leu Ala Gln Pro Gln Ser Leu Glu Arg His
 245 250 255
 Lys Glu Gln Leu Leu Ala Ala Glu Pro Val Arg Ala Lys Leu Asp Arg
 260 265 270
 Gln Arg Arg Val Phe Gln Pro Ser Pro Leu Ala Ser Gln Phe Glu Leu
 275 280 285
 Pro Gly Asp Phe Phe Asn Leu Thr Ala Glu Glu Ile Lys Arg Glu Gln
 290 295 300
 Arg Leu Arg Ser Glu Ala Val Glu Arg Leu Ser Val Leu Arg Thr Lys
 305 310 315 320
 Ala Met Arg Glu Lys Glu Glu Gln Arg Gly Leu Arg Lys Tyr Asn Tyr
 325 330 335
 Thr Leu Leu Arg Val Arg Leu Pro Asp Gly Cys Leu Leu Gln Gly Thr
 340 345 350
 Phe Tyr Ala Arg Glu Arg Leu Gly Ala Val Tyr Gly Phe Val Arg Glu
 355 360 365
 Ala Leu Gln Ser Asp Trp Leu Pro Phe Glu Leu Leu Ala Ser Gly Gly
 370 375 380
 Gln Lys Leu Ser Glu Asp Glu Asn Leu Ala Leu Asn Glu Cys Gly Leu
 385 390 395 400
 Val Pro Ser Ala Leu Leu Thr Phe Ser Trp Asp Met Ala Val Leu Glu
 405 410 415
 Asp Ile Lys Ala Ala Gly Ala Glu Pro Asp Ser Ile Leu Lys Pro Glu
 420 425 430
 Leu Leu Ser Ala Ile Glu Lys Leu Leu
 435 440

<210> 7

<211> 100

<212> PRT

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<213> Homo sapiens

<400> 7

Met	Val	Pro	Ala	Ser	Arg	Ser	Arg	Glu	Gly	Pro	Glu	Asn	Met	Val	Arg
1				5				10					15		
Ile	Ala	Leu	Gln	Leu	Asp	Asp	Gly	Ser	Arg	Leu	Gln	Asp	Ser	Phe	Cys
		20					25				30				
Ser	Gly	Gln	Thr	Leu	Trp	Glu	Leu	Leu	Ser	His	Phe	Pro	Gln	Ile	Arg
	35				40						45				
Glu	Cys	Leu	Gln	His	Pro	Gly	Gly	Ala	Thr	Pro	Val	Cys	Val	Tyr	Thr
50				55						60					
Arg	Asp	Glu	Val	Thr	Gly	Glu	Ala	Ala	Leu	Arg	Gly	Thr	Thr	Leu	Gln
65				70				75						80	
Ser	Leu	Gly	Leu	Thr	Gly	Gly	Ser	Ala	Thr	Ile	Arg	Phe	Val	Met	Lys
				85				90						95	
Cys	Tyr	Asp	Pro												
			100												

<210> 8

<211> 1788

<212> DNA

<213> Mus musculus

<400> 8

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gaggagaggg	ttagggatag	gcttaccttc	gaaccgcggg	ccctctagac	tcgagcggcc	120
gccactgtgc	tggatatctg	cagaattgcc	cttagcgcgt	gaatcagatc	gggggtggtg	180
gcggggctag	acctctctct	ccagtggaga	tttgccaacc	tgccatacaa	tgccaagctg	240
gagatggtgc	ctgtgtcccg	tagccgcgag	gggcctgaga	acatagttcg	catcgcgttc	300
cagctggatg	acggctccag	gttgcaggac	gctttctgtt	cccacagac	tctctgggag	360
cttctcagcc	attttgcaca	gaccagggag	cgtctgcagc	agctgggtga	gaagacccct	420
gtctgcgtgt	acatgaggaa	tgaggtgact	ggtagagctg	ccttacagaa	cacaaccctt	480
cagtcaactg	gcctgacagg	tggtagtgcc	accatcaggt	ttgtcataaa	gcagtgtgac	540
accgccggca	aacaggagtc	catagccgtc	aggagcaagg	ccccgggaag	tccggctctcc	600
tccttggtcag	ccgaccaggc	atccagtagc	acattgcttc	ctctgaactc	tggggagttc	660
agcaggggag	acctaaacca	tgaggggtgat	gcaaacacct	cagggaccgg	ccttgagggg	720
ggccccaaac	caacggatgc	tcaaacaag	caaagcacca	gtgagcctgc	atcgcccccc	780
ttcgttccct	tctctggggg	gggccagcgg	ctggggggcc	cgtctgcgtc	cttgagacct	840
ctaacatcac	cttcggccaa	ttcatccaag	tctttctctg	gccctggggg	cccttctaag	900
cccaagaagc	caaagcctgg	tgaggagccc	cagcaggagc	ctgaaccgcc	cgttgaccga	960
gatcctgtgg	tgtaccaccc	tgacctagag	gacttgctac	agccctggcc	ggcagaggtg	1020
cctgacgagt	tctttgaggt	gactgtggat	gatgtgagga	gacgcttggc	ccagctcaag	1080
agtgagcggg	agcgtctgga	agaagcccc	ctggtgacca	aggctttcag	ggaggctcag	1140
atgaaggaga	aactggaacg	ttaccctaaag	gtggctctgc	gggtcctatt	ccctgaccgc	1200
tacatcctgc	agggtctctt	ccgccccagt	gagacagtgg	gggatcttcg	agactttgtt	1260
aggagccacc	tggggaaccc	cgagctctcc	ttttacctat	tcategctcc	acccaaaatg	1320
gtcctggatg	accacacgct	gactctcttt	caggcaaac	tcttcctgc	tgcgcttggtg	1380
cactttggag	ctgaagaacc	aacagggtctc	tatctggaac	ctgggctgct	agaacacacc	1440
gtctccccat	ctacagctga	tgtgctgggtg	gccagggtgta	tgtccccgggc	ttccgggtcc	1500
ccacctctgc	tgccagcccc	tgacctgta	tccctggagt	ctgagccaat	cgctgaggat	1560
ggggcactgg	ggccccaga	gccccatcaa	gggacagccc	agcctgtgaa	gagaagcctg	1620
ggcaaagtac	ccaagtggct	gaagctgcca	gccagcaaga	ggtgagagct	accagcctgg	1680
agatgcctat	caccagccac	aggacctac	ccccaccac	cccagcagg	aataaagagt	1740
cgcgcttctc	tcaaaaaaaaa	aaaaaaaaaa	aaaaaaaaaa	aaaaaaa		1788

<210> 9

<211> 1827
<212> DNA
<213> Mus musculus

<400> 9
acccacgcgt ggcggccacgc gtccgcccac gcgtccgggc gaagccggct gcggtcacgt 60
gagcgggaaga tggcggcccc ggcggggcggc ggggggctccg cgggtgtcggg gctggcccca 120
aacggggcggc gccacacggg gaagggtgacg ccgagcaccg tgctgtctgca ggtactagaa 180
gacacatgcc ggcgggaaga cttcaacccc agtgaatacg acctgaagtt tcagaggacg 240
gtgctagacc tctctctcca gtggagattt gccaacctgc ctaacaatgc caagctggag 300
atgggtgcctg tgtcccgtag ccgcgagggg cctgagaaca tagttcgcac cgcgttccag 360
ctggatgacg gctccagggt gcaggacgct ttctgttccc gacagactct ctgggagctt 420
ctcagccatt ttgcacagac cagggagcgt ctgcagcagc tgggtgagaa gaccctctgc 480
tgctgttaca tgaggaatga ggtgactggt agagctgcct tacagaacac aacccttcag 540
tactggggcc tgacaggtgg tagtgccacc atcaggtttg tcataaagca gtgtgacacc 600
gccggcaaac aggagtccat agccgtcagg agcaaggccc cgggaagtcc ggtctcctcc 660
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 Leu Gln Val Leu Glu Asp Thr Cys Arg Arg Gln Asp Phe Asn Pro Xaa
 35 40 45

Glu	Tyr	Asp	Leu	Lys	Phe	Gln	Arg	Xaa	Val	Leu	Asp	Leu	Ser	Leu	Gln
50						55				60					
Trp	Arg	Phe	Ala	Asn	Leu	Pro	Asn	Asn	Ala	Lys	Leu	Glu	Met	Val	Pro
65				70						75					80
Xaa	Ser	Arg	Ser	Arg	Glu	Gly	Pro	Glu	Asn	Xaa	Val	Arg	Ile	Ala	Xaa
			85						90					95	
Gln	Leu	Asp	Asp	Gly	Ser	Arg	Leu	Gln	Asp	Xaa	Phe	Cys	Ser	Xaa	Gln
			100					105					110		
Thr	Leu	Trp	Glu	Leu	Leu	Ser	His	Phe	Xaa	Gln	Xaa	Arg	Glu	Xaa	Leu
		115					120					125			
Gln	Xaa	Xaa	Gly	Xaa	Xaa	Thr	Pro	Val	Cys	Val	Tyr	Xaa	Arg	Xaa	Glu
	130					135					140				
Val	Thr	Gly	Xaa	Ala	Ala	Leu	Xaa	Xaa	Thr	Thr	Leu	Gln	Ser	Leu	Gly
145				150						155					160
Leu	Thr	Gly	Gly	Ser	Ala	Thr	Ile	Arg	Phe	Val	Xaa	Lys	Xaa	Xaa	Asp
				165					170					175	
Xaa	Xaa	Gly	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Lys	Xaa	Pro	Gly
		180						185				190			
Ser	Xaa	Xaa	Ser	Ser	Xaa	Ser	Ala	Xaa	Gln	Ala	Xaa	Xaa	Ser	Xaa	Xaa
	195					200						205			
Leu	Pro	Leu	Xaa	Ser	Gly	Glu	Xaa	Ser	Arg	Gly	Asp	Leu	Xaa	Xaa	Xaa
	210					215					220				
Xaa	Asp	Ala	Xaa	Thr	Ser	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Gly	Pro	Xaa	Xaa
225				230						235					240
Xaa	Xaa	Xaa	Gln	Xaa	Lys	Gln	Ser	Thr	Xaa	Xaa	Pro	Ala	Xaa	Ala	Pro
				245					250					255	
Phe	Val	Pro	Phe	Ser	Gly	Gly	Gly	Gln	Arg	Leu	Gly	Gly	Pro	Xaa	Xaa
			260					265					270		
Xaa	Xaa	Arg	Pro	Leu	Thr	Ser	Xaa	Ser	Ala	Xaa	Xaa	Xaa	Lys	Ser	Xaa
		275					280						285		
Ser	Xaa	Pro	Gly	Gly	Pro	Ser	Lys	Pro	Lys	Lys	Xaa	Lys	Xaa	Gly	Xaa
	290					295					300				
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Pro	Gln	Gln
305				310						315					320
Glu	Xaa	Glu	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Pro	Val	Asp	Arg	Arg	Xaa
				325					330				335		
Pro	Val	Val	Xaa	His	Pro	Asp	Leu	Glu	Xaa	Xaa	Leu	Gln	Xaa	Trp	Pro
			340					345					350		
Ala	Glu	Xaa	Pro	Asp	Glu	Phe	Phe	Glu	Xaa	Thr	Val	Asp	Asp	Val	Arg
		355					360					365			
Arg	Arg	Leu	Ala	Gln	Leu	Lys	Ser	Glu	Arg	Lys	Arg	Leu	Glu	Glu	Ala
	370					375					380				
Pro	Leu	Val	Thr	Lys	Ala	Phe	Arg	Glu	Ala	Gln	Xaa	Lys	Glu	Lys	Leu
385				390						395					400
Glu	Arg	Tyr	Pro	Lys	Val	Ala	Leu	Arg	Val	Leu	Phe	Pro	Asp	Arg	Tyr
				405					410					415	
Xaa	Leu	Gln	Gly	Phe	Phe	Arg	Pro	Ser	Glu	Thr	Val	Gly	Asp	Leu	Arg
			420					425					430		
Asp	Phe	Val	Arg	Ser	His	Leu	Gly	Asn	Pro	Glu	Leu	Ser	Phe	Tyr	Leu
	435						440					445			
Phe	Ile	Xaa	Pro	Pro	Lys	Xaa	Val	Leu	Asp	Asp	His	Thr	Xaa	Thr	Leu
	450					455					460				
Phe	Gln	Ala	Asn	Leu	Phe	Pro	Ala	Ala	Leu	Val	His	Xaa	Gly	Ala	Glu
465				470						475					480
Glu	Pro	Xaa	Gly	Xaa	Tyr	Leu	Glu	Pro	Gly	Leu	Leu	Glu	His	Xaa	Xaa
				485					490					495	

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Ser Pro Ser Xaa Ala Asp Val Leu Val Ala Arg Xaa Met Ser Arg Ala
 500 505 510
 Xaa Gly Ser Pro Xaa Xaa Leu Pro Ala Pro Asp Pro Xaa Xaa Xaa Xaa
 515 520 525
 Ser Glu Pro Xaa Ala Glu Xaa Gly Ala Leu Xaa Pro Pro Glu Pro Ile
 530 535 540
 Xaa Gly Thr Ala Gln Pro Val Lys Arg Ser Leu Gly Lys Val Pro Lys
 545 550 555 560
 Trp Leu Lys Leu Pro Ala Ser Lys Arg
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<220>
 <223> primer

<400> 11
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<210> 12
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<220>
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<400> 12
 ggccccgcggg tcattctcat ctggccc 27

<210> 13
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<220>
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<400> 13
 ccggccgaat tcatgccgtc gggtttccag cagatc 36

<210> 14
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<220>
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<400> 14
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<210> 15

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<211> 44
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 <213> Artificial Sequence

<220>
 <223> primer

<400> 15
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<210> 16
 <211> 58
 <212> DNA
 <213> Artificial Sequence

<220>
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<400> 16
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 <211> 82
 <212> PRT
 <213> Unknown

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 1 5 10 15
 Phe Leu Glu Arg Arg Phe Leu Ala Ser Asn Lys Leu Gln Ile Val Phe
 20 25 30
 Asp Phe Val Ala Ser Lys Gly Phe Pro Trp Asp Glu Tyr Lys Leu Leu
 35 40 45
 Ser Thr Phe Pro Arg Arg Asp Val Thr Gln Leu Asp Pro Asn Lys Ser
 50 55 60
 Leu Leu Glu Val Lys Leu Phe Pro Gln Glu Thr Leu Phe Leu Glu Ala
 65 70 75 80
 Lys Glu

<210> 18
 <211> 86
 <212> PRT
 <213> Unknown

<220>
 <223> UBX Domain of L1UB3

<400> 18
 Met Lys Glu Lys Leu Glu Arg Tyr Pro Lys Val Ala Leu Arg Val Leu
 1 5 10 15
 Phe Pro Asp Arg Tyr Ile Leu Gln Gly Phe Phe Arg Pro Ser Glu Thr
 20 25 30

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```

Val Gly Asp Leu Arg Asp Phe Val Arg Ser His Leu Gly Asn Pro Glu
      35              40              45
Leu Ser Phe Tyr Leu Phe Ile Ala Pro Pro Lys Met Val Leu Asp Asp
      50              55              60
His Thr Leu Thr Leu Phe Gln Ala Asn Leu Phe Pro Ala Ala Leu Val
      65              70              75              80
His Phe Gly Ala Glu Glu
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<210> 19
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<213> Unknown

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<220>
<223> UBX Domain of L1UB2

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Phe Gln Leu Asp Asp Gly Ser Arg Leu Gln Asp Ala Phe Cys Ser Arg
      20              25              30
Gln Thr Leu Trp Glu Leu Leu Ser His Phe Ala Gln Thr Arg Glu Arg
      35              40              45
Leu Gln Gln Leu Gly Glu Lys Thr Pro Val Cys Val Tyr Met Arg Asn
      50              55              60
Glu Val Thr Gly Arg Ala Ala Leu Gln Asn Thr Thr Leu Gln Ser Leu
      65              70              75              80
Gly Leu Thr Gly Gly
              85

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<210> 20
<211> 103
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<220>
<223> UBX Domain of Sumo

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Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys Val Ile Gly Gln Asp
      20              25              30
Ser Ser Glu Ile His Phe Lys Val Lys Met Thr Thr His Leu Lys Lys
      35              40              45
Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val Pro Met Asn Ser Leu
      50              55              60
Arg Phe Leu Phe Glu Gly Gln Arg Ile Ala Asp Asn His Thr Pro Lys
      65              70              75              80
Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu Val Tyr Gln Glu Gln
              85              90              95
Thr Gly Gly His Ser Thr Val
              100

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Cys	Cys	Glu	Glu	Glu	Glu	Glu	Glu	Glu	Glu	Cys	Cys	Cys	Cys	Cys	Cys	Cys
1				5					10						15	
Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys
			20						25					30		
Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys	Cys
		35					40						45			

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```

Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys
 50          55          60
Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys
 65          70          75          80
Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys
          85          90          95
Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys
          100          105          110
Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys
          115          120          125
Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys
          130          135          140
Cys Cys Cys Cys Cys Cys Cys Cys Cys Cys Glu Glu Glu Cys Cys Cys
 145          150          155          160
His His His His His His His Cys Cys Cys Cys Cys Cys His His His
          165          170          175
His His His His His His His His His His His His His His His
          180          185          190
His His His His His His Cys Cys Cys Cys His His His His His
          195          200          205
His Cys Cys Cys
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<212> PRT
<213> Unknown

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<220>
<223> L1 target sequence

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Gln Glu Ser Ile Ala Val Arg Ser Lys Ala Pro Gly Ser Pro Val Ser
          20          25          30
Ser Leu Ser Ala Asp Gln Ala Ser Ser Ser Thr Leu Leu Pro Leu Asn
          35          40          45
Ser Gly Glu Phe Ser Arg Gly Asp Leu Asn His Glu Gly Asp Ala Asn
          50          55          60
Thr Ser Gly Thr Gly Leu Glu Gly Gly Pro Lys Pro Thr Asp Ala Gln
 65          70          75          80
Thr Lys Gln Ser Thr Ser Glu Pro Ala Ser Ala Pro Phe Val Pro Phe
          85          90          95
Ser Gly Gly Gly Gln Arg Leu Gly Gly Pro Ser Ala Ser Leu Arg Pro
          100          105          110
Leu Thr Ser Pro Ser Ala Asn Ser Ser Lys Ser Phe Ser Gly Pro Gly
          115          120          125
Gly Pro Ser Lys Pro Lys Lys Pro Lys Pro Gly Glu Glu Pro Gln Gln
          130          135          140
Glu Pro Glu Pro Pro Val Asp Arg Asp Pro Val Val Tyr His Pro Asp
 145          150          155          160
Leu Glu Asp Leu Leu Gln Pro Trp Pro Ala Glu Val Pro Asp Glu Phe
          165          170          175
Phe Glu Val Thr Val Asp Asp Val Arg Arg Arg Leu Ala Gln Leu Lys
          180          185          190

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Ser Glu Arg Lys Arg Leu Glu Glu Ala Pro Leu Val Thr Lys Ala Phe
 195 200 205
 Arg Glu Ala Gln
 210